

WATERSHED WATCHERS

Overview: In this activity, students will identify potential community action projects they can undertake to help protect or restore creeks, water quality, or wetlands of the San Francisco Bay watershed.

Content Standards Correlations: Language Arts, p. 311

Grades: K-6

Key Concepts:

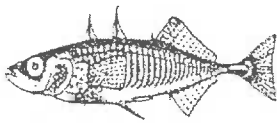
Community participation helps students realize that their actions can help protect and restore San Francisco Bay habitats.

Objectives:

Students will be able to:

- work as a group to plan and carry out a project that accomplishes their goal
- protect and restore a local creek or improve water quality in the San Francisco Bay or help protect and restore wetlands or their nearby upland habitats

Time: Varies with each action project; can range from several 30 -50 minute class periods to a major class project lasting a semester.



Threespine Stickleback

Adapted from "Working for California's Wetlands," p. 77, Wetlands Protectors, "Befriend Your Local Creek," p. 85, Creek Watchers, and "Protect the Earth's Water Supply," p. 51, Fresh Water Guardians, California Aquatic Science Education Consortium.

SUPPORTING INFORMATION FOR THIS ACTIVITY

- Young people are often extremely concerned about the future of the environment and the protection of wildlife. Through community service or public education projects they can contribute significantly and tangibly to the protection of the San Francisco Bay watershed, either through protection of water quality, of a wetland, or of a creek.
- A watershed is the region that drains into a body of water, such as the San Francisco Bay. The water cycle is at the heart of the watershed. Pacific Ocean water evaporates and forms clouds that travel inland. As the clouds rise over mountains, they are forced to rise and cool, causing rain or snow. The rain or melted snow that runs down the western slopes of the mountains flows into creeks or rivers; 40% of California's runoff flows through the Bay and Delta on its way to the Pacific Ocean.
- Clean water is critical for the survival of most living things on the earth. Unfortunately, water is often polluted by humans. In a watershed, water can be polluted at points far away from where the pollution harms habitats and wildlife.
 - There are two types of water pollution: point source and non-point source pollution.
 - Point source pollution is focused at one point, such as a water pollution control plant or an industry along the bay.
 - Non-point source pollution is also known as runoff, and includes the water that runs off the surrounding land into the Bay, such as agricultural runoff, and runoff from that travels through storm drains, such as motor oil or pesticides.
 - Many individuals and organizations are working to educate others on how to prevent water from becoming polluted.
 - The best ways to prevent pollution are at the source: using alternatives to toxics and preventing toxics from entering watersheds.
- Creeks and streams of the San Francisco Bay watershed are valuable and fragile ecosystems.
 - One of their main values is that they provide habitat for a great variety of plants and wildlife. Particularly within urban areas, creeks and streams often provide a last remaining natural area that wildlife can use for food, water, and shelter.
 - Creeks and streams are fragile in that their health is easily destroyed through human actions.

- The things that most threaten their health and the plants and wildlife that depend on them are: dumping of garbage, erosions of stream banks, water running off streets when it rains and carrying pollution into creeks and streams, water pollution from businesses, individuals that illegally dump down storm drains, removal of streamside trees and plants, cementing of creek beds, and constructing buildings or roads too close to creeks and streams.
- Wetlands around the Bay are at the base of the watershed.
 - Bay wetlands filter sediments and pollution, control floods, provide habitat for plants and animals, including two endangered species, and provide resting and feeding stops for migratory birds.
 - More than 80 % of San Francisco Bay wetland habitats have been lost to development.
 - The things that most threaten the health of wetlands and the wildlife that depend on them are: water pollution from streams and storm drains that flow into wetlands, garbage dumping, nonnative plant species crowding out native wetland plants, and development upon wetlands.

TEACHING METHOD

Introduction

Do

Review the questions below with students before choosing a class project.

Ask

? What is a watershed? (A watershed is the region that drains into a body of water, such as the San Francisco Bay. Rivers and creeks carry rainwater, melting snow, and treated water from water pollution control plants through the Bay and Delta toward the Pacific Ocean. Once pollution enters a watershed, it effects the health of its creeks, streams, and wetlands. See p. 14 & 15 for more watershed information and a watershed map.)

? What are some ways that humans harm the water quality of a watershed - its creeks, streams, rivers, bays, and ocean? (By dumping hazardous materials, such as paint or pesticide sprays into storm drains, illegal dumping into creeks, oil spills, sediment from eroding creek banks, etc. Anything that goes down the storm drain runs directly to creeks and streams and ultimately, to the Bay.)

? Does anyone know of any nearby creeks or streams of their watershed? (See if the students can name any nearby creeks or streams.)

? To which body of water do our local creeks run? (Most rivers, creeks, and streams around the Bay flow to the Bay, but along the coast they may flow to the Pacific Ocean. Check a map if you are not sure where your local creeks run to.)

? Can anyone describe what our local creeks look like? (Discuss the appearance of the creeks or streams in your area.)

? What are some ways that creeks and streams are polluted? (Pollution, such as motor oil, soapy water, or pesticides, that goes down storm drains, littering, illegal dumping of pollution or garbage, soil erosion.)

? How does erosion damage creeks and the Bay? (Erosion causes sediment to wash into creeks and to the Bay. Sediment can clog fish gills and harm filter feeders, such as clams and mussels.)

? How do we cause erosion of creek banks? (Removal of plants from creek banks, riding bikes along creek banks, sliding down creek banks, and walking off of approved creek trails.)

? How would the cementing of creek beds harm creeks and the Bay? (It destroys creek habitat for plants and animals and it may contribute to flooding.)

? What are some ways that wetlands are destroyed around the Bay? (Landfills, buildings, roads, airports, and salt ponds have been built on top of wetlands.)

? Once pollution enters the Bay, it affects the health of wetlands. What percentage of wetlands still exist around the Bay? (Less than 20%.)

? Why are wetlands around the Bay important? (They are a home for plants and animals, the California clapper rail and salt marsh harvest mouse, endangered species, depend upon wetlands, migratory birds use wetlands, wetlands filter pollutants and sediment, wetlands provide flood control.)

? What are some ways that you can help protect the San Francisco Bay watershed?

? What projects would you want to do to help the Bay?

? How could you help creeks and streams that flow to the Bay?

? How could you protect water quality in the Bay?

? How could you protect the wetlands in San Francisco Bay?

Do

Select a Class Project

Brainstorm with students different ideas for their class project. Below are some ideas and resources on how students can protect water quality of the watersheds of San Francisco Bay. These ideas may surface during the discussion or you may want to contribute them. Through discussion, help the students identify one or two projects that they can actually carry out. Choose projects appropriate for your students organizational ability and skill levels.

As a group, develop a written plan for the project. Include a schedule showing who is responsible for what and in what time frame. During this planning phase be sure to identify the type of help needed from parents, community groups, natural resource agencies, and others.

Conduct the Field Work for the Project

Carry out as much of the project as possible. Encourage the students to follow the project through to completion. Make arrangements for completing any work the students cannot accomplish.

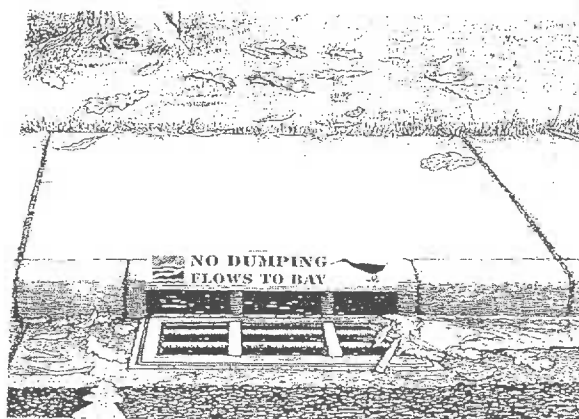
Post Project Activities

Talk about the successes or shortcomings of the finished project. A few weeks after the project is completed, have several students arrange to visit the site where work was done or displayed to determine if any follow-up is required. Provide recognition for the group's good work, perhaps through media attention, a trip, a party, an assembly, a presentation of "thank you" from the recipient group with press coverage, etc.

Note: It may be wise to start with something small that can be finished with great success than with a large project that might be beyond the students' reach.

POLLUTION BUSTERS OF YOUR LOCAL CREEK AND WETLAND

- Organize a creek clean-up or participate in Coast Cleanup Day in September. Call 1-800 COAST4U or visit their webpage at www.coastal.ca.gov/publiced/ccd/ccd.html.
- Develop a presentation about the things that threaten the health of creeks, streams, and the San Francisco Bay. Deliver your presentation at a school assembly, city council meeting, other schools, parent meetings, local environmental fairs or open houses at the Refuge.
- Identify sites where garbage is frequently dumped and try to prevent future garbage dumping by carrying out the following measures:
- Ask the city to post a sign where the worst dumping takes place.
- Work with local Urban Creeks council group to come up with solutions to prevent dumping at a particular site. Call Urban Creeks (see reference below).
- Encourage used motor oil recycling in your community. Contact the State of California, Department of Toxic Substances Control, Used Oil Recycling for ideas. (818) 551-2830.
- Be watchful citizens, report any action that degrade San Francisco Bay wetlands. (Call the Wetlands Protection Hotline, Environmental Protection Agency: 1-800-832-7828 or visit them online at www.epa.gov/owow/wetlands/wetline.html)



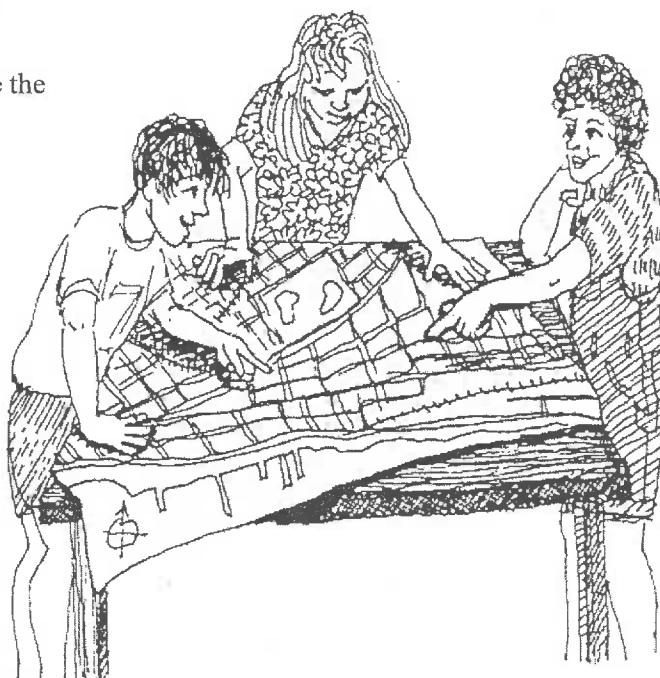
WATERSHED GUARDIANS OF LOCAL CREEKS AND WETLANDS

Restoration Projects

- “Adopt” a creek, stream or wetland in your community by visiting it regularly and helping monitor and maintain its health by keeping it clean of litter and pollution. You can conduct water testing and observation to check its health, report water pollution, and involve neighbors to help with your project to educate others about the value of your adopted creek or wetland. Contact Aquatic Outreach Institute for information. (See reference below.)
- Participate in a freshwater habitat restoration project such as revegetation, irrigation, weeding or cleanup. For information on a local project contact The Nature Conservancy of California or the nearest Urban Creeks Council (see reference below).
- Remove non native plants and grow native seedling plants to be reintroduced on an upland bordering a salt marsh. First, contact a site and find out what plants they need. Contact the Estuary Restoration Group at Friends of the Estuary (510) 622-2465, or www.abag.ca.gov/bayarea/sfep/about/friends.html for restoration ideas.
- Educate the community about the value of non-polluted creeks that flow to San Francisco Bay by creating and displaying murals, window paintings, or posters in local businesses or public buildings, that illustrate the importance of creeks and wetlands.
- Use local maps to identify and chart the path of a local creek or visit the creek and write down information about it’s condition. What plants and animals are there? What type of development is nearby? Are there any visible signs of pollution or erosion? Measure the salinity, temperature, pH, turbidity, and dissolved oxygen, if possible. Present findings to a community group.
- Develop a presentation about the value of creeks and wetlands and the importance of clean water (skit, song, talk, slide show, photo essay, or video) and show it a community group or other classes in your school.
- Adopt-an-Endangered Species of San Francisco Bay and make others aware of its plight (make buttons, attend city council meetings, attend fairs with a display, get your story out to the press).

Community Action Projects

- Become involved in a community group that works to enhance and protect a local Bay wetland (Save the Bay, Citizens to Complete the Refuge).



TAKING RESPONSIBILITY FOR YOUR PERSONAL ACTIONS AT HOME AND AT SCHOOL

Ways to reduce at school

- Develop a 3 Rs (reducing, reusing, and recycling) program in your classroom or school. Include paper, glass, aluminum, and plastic containers for your recycling program.
- Students can attempt to produce no waste for a week. Record the methods used to reduce garbage.
- Use the back sides of waste paper for notes or copies (you could allow students to submit homework on the back side of used paper).
- Make double-sided copies.
- Make book covers out of used paper grocery bags or paper ream wrappers.
- Work with other students and your school to set up a recycling program for paper, glass, aluminum, and plastic containers.

Ways to reduce at home:

- Try to buy products that use recycled materials, such as recycled packaging material and recycled paper. This completes the recycling loop.
- Pack your lunch in reusable containers, such as old yogurt or margarine containers.
- Reuse plastic and paper lunch bags several times.
- Avoid disposable plates, cups, plasticware, etc. Bring your own.
- Recycle! You can easily recycle paper, glass, aluminum, and plastic containers with curbside recycling at home or at a recycling center.



RESOURCES FOR COMMUNITY ACTION PROJECTS

To report pollution or debris in creeks and streams, contact one of the following:

- California Regional Water Quality Control Board, San Francisco Bay Region, Oakland. (510) 622-2300. www.swrcb.ca.gov/rwqcb2.
- California Department of Fish and Game, Region 3, Yountville, (707) 944-5500 or www.dfg.ca.gov.
- Environmental Health department in your county.

To conduct a creek restoration and adopt-a-creek project contact:

- California Urban Creek Council (state office) (510) 540-6669, or www.urbancreeks.org. You will be directed to the local creek council near your community.
- *Dipping into Creeks*, an excellent Adopt-a-Stream packet available for \$20.00 from the Sacramento Chapter of the Urban Creek Council, (916) 454-4544.

For creek revegetation projects contact:

- Natural Resource Conservation Service, (530) 527-4231 or www.nacdnet.org/about/districts/directory/ca.phtml. You will be directed to the local office near your community. You may also try: Alameda County Resource Conservation District, (925) 371-0154. www.acrcd.org or Guadalupe-Coyote Resource Conservation District, (408) 288-5888. <http://home.pacbell.net/gcrd/>
- State Department of Water Resources, Urban Stream Restoration Program, (916) 327-1664. www.dpla.water.ca.gov/environment/habitat/stream/usrp.html.

For water quality projects contact:

- Project Water Science, Water Education Foundation. (916) 444-6240 or www.water-ed.org.
- Curriculum Guides and Posters, California Department of Water Resources, Office of Water Education Publications, (916) 653-1097 or www.water.ca.gov/education/.
- Contact your county water department for posters, curriculum guides, videos, etc. on water education

SAN FRANCISCO BAY WETLANDS YOU CAN VISIT

East San Francisco Bay: (partial list)

- Don Edwards San Francisco Bay National Wildlife Refuge, Visitor Center, Newark, CA, (510) 792-0222, or www.fws.gov/desfbay
- Coyote Hills Regional Park, Fremont, CA, (510) 795-9385, or www.ebparks.org
- Alameda Creek Regional Trail, Fremont, CA, (510) 790-2612, or www.ebparks.org
- Hayward Shoreline Interpretive Center, Hayward, CA, (510) 670-7270, or www.haywardrec.org/hayshore.html
- Martin Luther King Regional Shoreline and Oyster Bay Regional Shoreline, (510) 562-1373, or www.ebparks.org
- Crown Memorial State Beach, Alameda, CA. (510) 521-7090, or www.ebparks.org.
- Crab Cove Visitor's Center, Alameda, CA, (510) 521-6887, www.ebparks.org.
- Emeryville Marina, Emeryville, CA, (510) 654-3716.
- Emeryville City Recreational Dept., Emeryville, CA. (510) 596-4395. www.ci.emeryville.ca.us/rec

South and West San Francisco Bay: (partial list)

- Don Edwards San Francisco Bay National Wildlife Refuge, Environmental Education Center, Alviso, CA, (408) 262-5513, www.fws.gov/desfbay/enviro.htm
- Alviso Boat Dock, Alviso, CA, (408) 262-3885.
- Sunnyvale Parks and Recreation, (408) 730-7517.
- Santa Clara Parks and Recreation, (408) 615-2260, http://santaclara.gov/park_recreation/pr_dept.html
- Baylands Preserve and Interpretive Center, Palo Alto, CA, (650) 496-6962, or www.city.palo-alto.ca.us/depts/csd/parks_and_open_space/preserves_and_open_spaces/the_baylands.asp

FOR CURRICULUM-BASED ACTION PROJECTS ABOUT WATERSHEDS

- The Watershed Project developed a creek exploration and restoration program called Kids in Creeks for Alameda County Urban Runoff Clean Water Program. Grades 3-12, (510) 231-5784. www.thewatershedproject.org
- Adopt-A-Watershed is a K-12 community-school learning experience. It encourages stewardship and weaves education with local government, business and the community. Built on developing collaboration partnerships, the program reinforces learning through community service. To obtain a copy of Adopt-A-Watershed Curriculum Unit Matrix contact, (530) 628-5334. www.adopt-a-watershed.org

